BIOLOGICAL EVALUATION
Western Budworm Infestation

National Forest, Indian, State,
and Private Lands

Region 3

1967

The western budworm is currently infesting 300,000 acres of mixed conifer forests in New Mexico, a reduction of 140,000 acres from last year. In September, an egg mass survey was conducted to predict population trends and defoliation for 1968. A total of 23 plots were sampled on five units (see map).

The results of the egg mass survey indicated that the western budworm population trend is static or downward, with the exception of two plots on the Taos Unit. The 1968 defoliation will range from none to moderate throughout the infested area.

Control measures against the budworm are not recommended for 1968.

## General Information

Insect - Western budworm, Choristoneura occidentalis Freeman

Hosts - Douglas-fir, Pseudotsuga menziesii (Mirb.) Franco
White fir, Abies concolor (Gord. & Glend.) Lindl.
Corkbark fir, Abies lasiocarpa var. arizonica (Merriam) Lemm.
Blue spruce, Picea pungens Engelm.
Engelmann spruce, Picea engelmannii Parry

## Sampling Procedures

A sample plot consisted of five dominant or codominant Douglas-fir or white fir trees, 30 to 50 feet high. Two midcrown branches were removed from each sample tree. The foliage was clipped from one side of each branch and discarded. The remaining foliage was then measured, clipped, and put in paper bags and taken to the laboratory in Santa Fe for examination.

Needles with egg masses or any artifacts were removed from the branch samples and held for examination by an entomologist. The egg masses were separated as to old or new by the entomologist for analysis in determining population trends and intensity.

## Methods of Analysis

The procedure for determining trend of the infestations has been altered from previous years. In the past, the number of current new egg masses and the number of new egg masses collected the preceding year in the same general plot areas were compared. Trend was then determined by inspection of these two consecutive years' data. This year, the old and new egg mass data were obtained from the same sample branches; population trends were then determined by statistical procedures outlined by Buffam and Carolin.[1/] The number of old egg masses collected this year, therefore, will not correspond to the number of new egg masses shown in the 1966 evaluation.

New egg mass densities, expressed as number per thousand square inches of foliage, are compared to the following chart[2/] for the defoliation prediction.

| Egg masses per 1,000 sq. in. of foliage | Percent defoliation | Defoliation class |
|---|---|---|
| 1 | 5 | Light |
| 2 | 10 | |
| 3-5 | 25 | |
| 6-10 | 50 | Moderate |
| 11-16 | 75 | Heavy |
| 17-20 | 90 | Severe |
| 21 or more | 95-100 | |

## Results and Discussion

The number of old and new egg masses, population trends, percent defoliation predicted, and defoliation class for 1968 are presented in Table 1. Trends were considered significant at $p = 0.20$, or correct 4 out of 5 times.

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1/ Buffam, P. E. and V. M. Carolin, Jr. 1966. Determining trend in western spruce budworm egg populations. J. Econ. Entomol. 59(6): 1442-4.
2/ Table developed by Rocky Mountain Forest and Range Expt. Sta. for New Mexico and Colorado.

Table 1. Summary of old and new western budworm egg mass survey data, Region 3

| Unit<br>Sample Plot | Egg masses per 1,000 sq. in. foliage (Both from 1967 foliage sample)<br>Old | <br>New | Predicted defoliation 1968 | Defoliation class 1968 | Trend Significant at p = 0.20 |
|---|---|---|---|---|---|
| Eagle Nest Unit | | | | | |
| Cyphers Mine | 19.6 | 9.9 | 50% | Moderate | Down |
| Garcia Peak | 1.2 | 0.3 | <5% | Light | Static |
| State Wildlife Area | 3.1 | 3.5 | 25% | Light | Static |
| Chama Unit | | | | | |
| Brazos Box | 3.8 | 0.0 | 0% | 0 | Down |
| Taos Unit | | | | | |
| **Upper Arroyo Hondo | 0.2 | 0.1 | <5% | Light | Static |
| **Middle Arroyo Hondo | 6.8 | 3.7 | 25% | Light | Down |
| **Lower Arroyo Hondo | 4.6 | 7.0 | 40% | Moderate | Up |
| **Upper Capulin Canyon (Capulin Peak) | 2.6 | 3.3 | 25% | Light | Static |
| **Lower Capulin Canyon (Capulin Canyon) | 4.0 | 3.5 | 25% | Light | Static |
| **Rio Pueblo (Simpson Canyon) | 8.5 | 7.1 | 50% | Moderate | Static |
| Garcia Park | 0.0 | 0.1 | <5% | Light | Static |
| Palo Flechado Pass | 0.1 | 0.0 | <5% | Light | Static |
| Rio Chiquito | 0.0 | 0.0 | <5% | Light | Static |
| Pioneer Creek | 0.3 | 4.0 | 30% | Moderate | Up |
| Cloudcroft Unit | | | | | |
| *Alamo | 0.3 | 0.4 | <5% | Light | Static |
| *Benson Ridge | 0.0 | 0.1 | <5% | Light | Static |
| Nelson Canyon | 1.6 | 1.4 | <5% | Light | Static |
| Mescalero Indian Reservation | 0.0 | 0.0 | Endemic | 0 | Static |
| *Upper Sacramento | 0.7 | 0.5 | <5% | Light | Static |
| *Lower Sacramento | 11.5 | 4.3 | 25% | Light | Down |
| Navajo Indian Reservation Unit | | | | | |
| Roof Butte | 0.0 | 0.0 | 0% | 0 | Static |
| Roof Butte Burn | 0.0 | 0.0 | 0% | 0 | Static |
| Washington Pass | 0.0 | 0.0 | 0% | 0 | Static |

* Plots established in 1967
** Area treated with malathion in 1966

Of the 23 plots sampled, the infestation trends are static or downward, with the exception of two plots on the Taos Unit. Lower Arroyo Hondo and Pioneer Creek both increased, with moderate defoliation predicted next year. Seventeen plots will exhibit a static trend next year and four plots will be downward.

Egg mass surveys indicate defoliation in 1968 will range from 0 to 50 percent for plots sampled, with significant defoliation occurring only in scattered pockets. Of the 23 plots sampled, 14 will receive light defoliation, 4 moderate defoliation, and 5 plots will not receive any defoliation. Following is a list of Entomological Units describing location, extent, defoliation, and damage as recorded from ground and aerial surveys:

Eagle Next -

Location: State and private land, east of Carson National Forest.

Extent: 130,000 acres infested; a decrease of 100,000 acres.

1967 Defoliation: Light to moderate.

Damage: Localized top-killing with severity of damage decreasing.

Santa Fe -

Location: Western Division of the Santa Fe National Forest.

Extent: Endemic infestation. Not sampled in the 1967 egg mass survey.

1967 Defoliation: None.

Damage: Insignificant.

Chama -

Location: Private land, west of Carson National Forest.

Extent: Endemic infestation; a decrease of 40,000 acres.

1967 Defoliation: None.

Damage: Insignificant.

Taos -

Location: Eastern Division of Carson National Forest.

Extent: 80,000 acres; static.

1967 Defoliation: Light to moderate.

Damage: Some top-killing of reproduction.

Cloudcroft -

Location: Lincoln National Forest and adjacent Mescalero Indian Reservation.

Extent: 90,000 acres. Infestation shifted northward from Nelson Canyon toward Cloudcroft, but the increase was offset by a forest fire within the infestation.

1967 Defoliation: Light to moderate.

Damage: Reproduction damaged in localized areas; no significant damage to overstory.

Navajo Indian Reservation -

Location: Chuska Mountains.

Extent: No noticeable infestation.

1967 Defoliation: None.

Damage: None.

Control of the infestations is not recommended in 1968. This recommendation is based on light to moderate defoliation predicted next year, coupled with the general decline of the population. The multiple use management objectives should not be adversely affected with the degree of defoliation expected in 1968.

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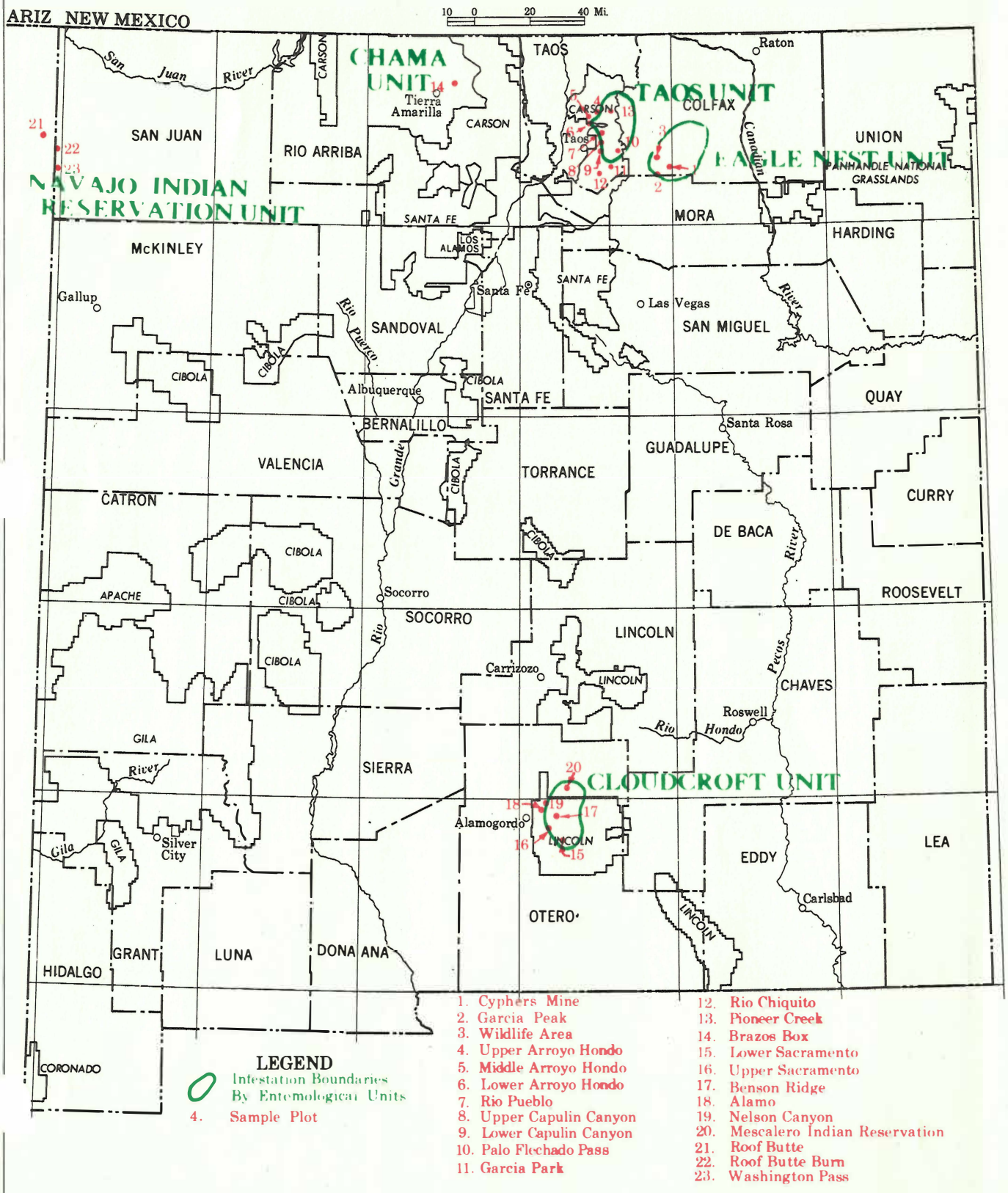
# WESTERN BUDWORM INFESTATION
## NATIONAL FOREST AND ADJACENT INDIAN, STATE, AND PRIVATE LANDS
### ARIZONA & NEW MEXICO

1967




**LEGEND**

Infestation Boundaries By Entomological Units

4. Sample Plot

1. Cyphers Mine
2. Garcia Peak
3. Wildlife Area
4. Upper Arroyo Hondo
5. Middle Arroyo Hondo
6. Lower Arroyo Hondo
7. Rio Pueblo
8. Upper Capulin Canyon
9. Lower Capulin Canyon
10. Palo Flechado Pass
11. Garcia Park
12. Rio Chiquito
13. Pioneer Creek
14. Brazos Box
15. Lower Sacramento
16. Upper Sacramento
17. Benson Ridge
18. Alamo
19. Nelson Canyon
20. Mescalero Indian Reservation
21. Roof Butte
22. Roof Butte Burn
23. Washington Pass